WHAT IS CLAIMED IS:

1. A power supply, comprising:

an output node operable to provide a regulated supply voltage;

a first main-phase drive circuit operable to provide a first main load current to the output node and having an on time and an off time; and

a first transient-phase drive circuit operable to provide a first transient load current to the output node and having an on time and an off time that are respectively less than the on and off times of the first main-phase drive circuit.

2. The power supply of claim 1, further comprising a filter capacitor coupled to the output node.

3. The power supply of claim 1, further comprising a circuit coupled to the main-phase and transient-phase drive circuits and operable to pulse-width modulate the main-phase and transient-phase drive circuits in response to the regulated supply voltage.

4. The power supply of claim 1 further comprising a circuit that is operable to activate the main-phase drive circuit when the regulated voltage strays from a first range and is operable to activate the transient-phase drive circuit when the regulated voltage strays from a second range that is greater than and includes the first range.

5. The power supply of claim 1, further comprising:

a second main-phase drive circuit operable to provide a second main load current to the output node and having an on time and an off time; and

a second transient-phase drive circuit operable to provide a second transient load current to the output node and having an on time and an off time that are respectively

less than the on and off times of the first and second main-phase drive circuits and the first transient-phase drive circuit.

6. The power supply of claim 1, further comprising:

a main filter inductor coupled between the first main-phase drive circuit and the output node; and

a transient filter inductor coupled between the transient-phase drive circuit and the output node, the transient filter inductor having a smaller inductance than the main filter inductor.

7. A power supply, comprising:

an output node operable to provide a regulated supply voltage;

a main-phase drive circuit operable to provide a first main load current to the output node;

a transient-phase drive circuit operable to provide a first transient load current to the output node;

a main-phase filter inductor having an inductance and coupled between the main-phase drive circuit and the output node; and

a transient-phase filter inductor coupled between the transient-phase drive circuit and the output node and having an inductance that is smaller than the inductance of the main-phase filter inductor.

8. The power supply of claim 7 wherein the inductance of the first main-phase filter inductor is approximately 500 nanohenries.

9. The power supply of claim 7 wherein the inductance of the fist transient-phase inductor is approximately 50 nanohenries.

10. The power supply of claim 7 wherein the inductance of the fist transient-phase inductor is approximately 5 nanohenries.

11. The power supply of claim 7 wherein:

the main-phase drive circuit has an on time and an off time; and

the transient-phase drive circuit has an on time and an off time that are respectively less than the on and off times of the main-phase drive circuit.

12. The power supply of claim 7, further comprising a circuit operable to pulse-width modulate the main-phase and transient-phase drive circuits.

13. An electronic system comprising:

a power supply comprising:

an output node operable to provide a regulated supply voltage;

a first main-phase drive circuit operable to provide a first main load current to the output node and having an on time and an off time; and

a first transient-phase drive circuit operable to provide a first transient load current to the output node and having an on time and an off time that are respectively less than the on and off times of the first main-phase drive circuit; and

an electronic component having a voltage supply node coupled to the output node of the power supply.

14. A method for powering a load, the method comprising:

switching a first current to a load at a first rate and for a first time; and

switching a second current to the load at a second rate and for a second time in response to a change in the load, the second rate being higher than the first rate, the second time being shorter than the first time.

15. The method of claim 14 wherein:

switching the first current comprises switching the first current to the load when a voltage across the load strays from a first predetermined range; and

switching the second current comprises switching the second current to the load when the voltage across the load strays from a second predetermined range that is larger than and includes the first predetermined range.

16. The method of claim 14, further comprising switching a third current to the load at a third rate and for a third time in response to a change in the load, the third rate being higher than the first rate and lower than the second rate, the third time being shorter than the first time and longer than the second time.

17. The method of claim 14 wherein:

switching the first current comprises switching the first current through a first inductor; and

switching the second current comprises switching the second current through a second inductor that has a smaller inductance than the first inductor.

18. The method of claim 14, further comprising filtering the first current with a first inductor and filtering the second current with a second inductor, the first inductor having an inductance an order of magnitude greater than the inductance of the second inductor.

19. The method of claim 14, further comprising switching a third current to the load at a third rate and for a third time in response to a change in the load, the third rate being higher than the second rate, and the third time being shorter than the second time.